

# A80 - A280 A80AE - A280AE

en

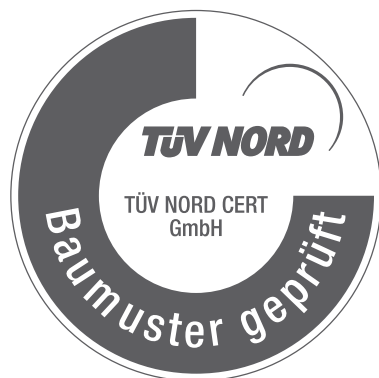
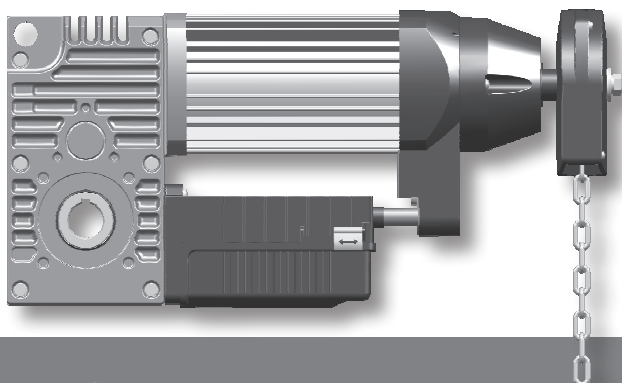
## Assembly and Operating Instructions Plug-in drives

Important information for:

- the fitter
- the electrician
- the user

Please forward accordingly!

These instructions must be kept safe for future reference.



# Assembly and Operating Instructions

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## Introduction

The drives A80 - A280 and A80AE - A280AE are high-quality products with a broad range of features and advantages. Please observe these Assembly and Operating Instructions when installing and setting the unit.

## Warranty

Structural modifications and incorrect installation which are not in accordance with these and our other instructions can result in serious injuries, e.g., crushing of limbs. Therefore, structural modifications may only be carried out with our prior approval and strictly in accordance with our instructions, particularly the information contained in these Assembly and Operating Instructions.

Any further processing of the products which does not comply with their intended use is not permitted.

The end product manufacturer and fitter have to ensure that all the relevant current statutory, official and, in particular, EMC regulations are adhered to during utilisation of our products, especially with regard to end product manufacture, installation and customer advice.

## Intended use

The plug-in drives A80 - A280 and A80AE - A280AE are exclusively designed for indoor use for the operation of roller doors, vertical lift gates, sectional doors and indirectly operated door systems as well as for special applications (subject to approval from Becker-Antriebe GmbH). The plug-in drive must not be used in potentially explosive areas. If the drives are to be used externally, special connection cables are required; PVC connection cables must be placed in a protective conduit. The plug-in drives A80AE - A280AE may only be operated in connection with a suitable control unit. This control unit must be able to evaluate the single-turn absolute value encoder in AE drives from Becker-Antriebe. Use for other purposes or for purposes beyond the above constitutes improper use.

Other applications (e.g., hoisting devices, awnings, winders), uses and modifications are not permitted in order to protect the safety of the users and others since these actions can impair the system's safety and carry the risk of personal injury and property damage. Becker-Antriebe does not accept liability for damages or injury arising from such actions.

Always observe the information in these instructions when operating or repairing the system. Becker-Antriebe does not accept liability for damages or injury resulting from improper actions.

# Safety instructions

The following safety instructions and warnings are intended to avert hazards and to prevent property damage and personal injury. **Please keep these instructions in a safe place.**



## Caution

Denotes a potentially hazardous situation. If this is not avoided, injuries may result.



## Attention

Denotes a potentially hazardous situation. If this is not avoided, the product or something in its vicinity may be damaged.



## Note

Denotes user tips and other useful information.



## Important safety instructions.

**Caution! Failure to observe these instructions can lead to serious injuries.**

**Follow the safety instructions contained in EN 12453, EN 12445 and BGR 232.**

- Work on the electrical installation, the electrical or electronic systems and units may only be carried out by a qualified electrician.
- Assembly may only be carried out by a trained and authorised specialist.
- Before using for the first time, the door system must be inspected by an expert to ensure that it is in a safe condition.
- Stop and disconnect the door system from the mains power supply when maintenance and cleaning is being performed either on the system itself or in the immediate vicinity of it.
- The national accident prevention regulations must be followed. Suitable protective clothing must be worn when installing the drive.
- When electrical or electronic equipment and units are operated, certain components are live. Physical injuries or damage to property can result in the event of unauthorised interventions or failure to heed warnings.
- All applicable standards and regulations for electrical installation must be complied with.
- Only use spare parts, tools and accessory devices which have been approved by the drive manufacturer.
- Unapproved third-party products or modifications to the system and its accessories represent a risk to your safety and the safety of others. This means that the use of unapproved third-party products, or modifications which have not been agreed with or approved by us, are prohibited. We do not accept liability for damages or injury arising from such actions.
- The limits given in the technical data must not be exceeded.
- When installing the drive at a height of less than 2.50 m, the drive must be covered as contact with the motor could result in burns.
- An adequate clearance distance must be maintained between the drive and combustible materials.
- When the safety limit switches are open, the control unit used must switch the drive off:
  - With A80 - A280, the safety limit switches are S1F, S2F, S3F, S4F
  - With A80AE - A280AE, the safety limit switches are S3F, S4F
- The door system must be protected against falling.
  - In the case of drives for roller doors, vertical lift gates, sectional doors and indirectly operated door systems, a suitable mechanism must be provided by the customer (external mechanism to catch the door or prevent it from rolling down) in order to reliably prevent the leaves/door from falling down in the event of failure of the load-bearing medium (e.g., cables or chains).
  - In the case of drives with a disconnecting clutch (AK) for use on a sectional door with spring compensation or a counterweight, it is imperative to install a spring fracture or anti-drop device to prevent the door from falling down.
  - In the case of drives with a light chain (LK) or crank handle (HK) it must be ensured that the torque on the drive is less than the static holding torque stated in the technical data should the spring fracture or counterweight fail.

If this is not the case, when using these drives the door must be prevented from falling down through installation of a spring fracture or anti-drop device.

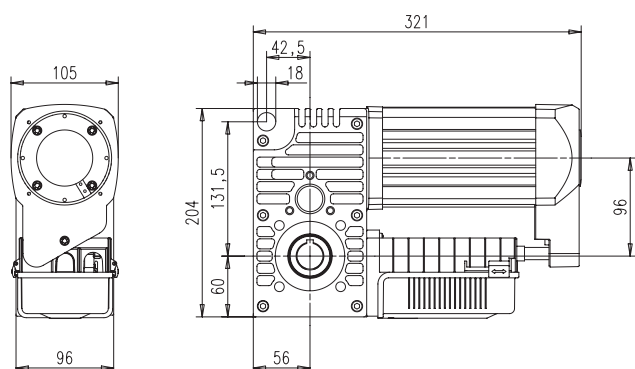


# Assembly and Operating Instructions

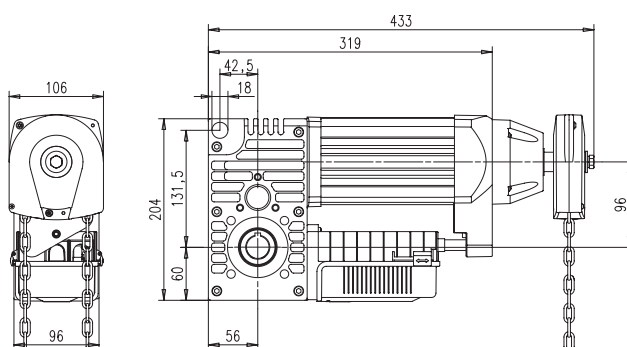
## Product overview and dimensions

All dimensions in mm.

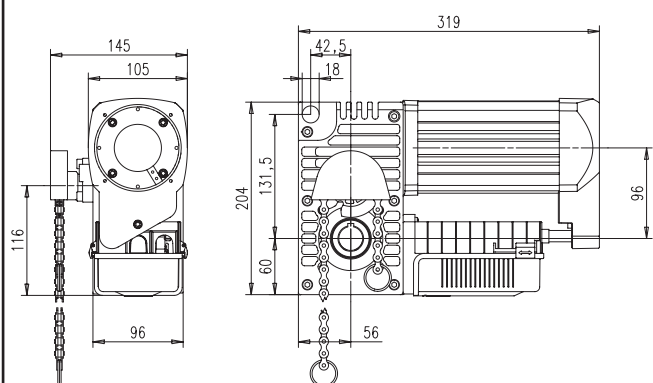
### Drives with a crank handle (HK)



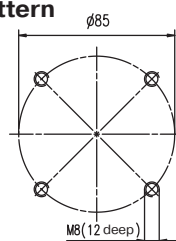
### Drives with a light chain (LK)



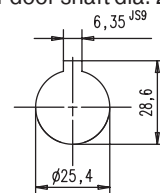
### Drives with a disconnecting clutch (AK)



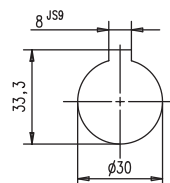
### Hole pattern



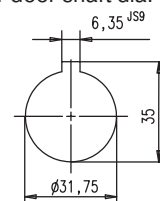
For door shaft dia. 25.4 mm



For door shaft dia. 30 mm



For door shaft dia. 31.75 mm



## Installation



### Caution

During installation of the drive, access to the danger zone must be blocked off.

The drive has to be mounted on a vibration reducing mounting or torque supporting plate (in accordance with the output of the drive) with adequate stability. Indirectly driven drives should not be mounted on a vibration reducing mounting. The tightening torque of the 4 fastening screws M8 (8.8) for securing the drive must, with a screw-in depth of 10 mm, be at least 20 Nm and no more than 25 Nm. Failure to observe this can result in the product or something in its vicinity being damaged. In the case of drives with a hollow shaft diameter of 25.4 mm / 31.75 mm, only the feather key supplied may be used. After fastening the drive, the feather key must be secured from moving using the screws supplied.

When installing the drive, it must be ensured that the drive is protected against soiling (e.g., drilling dust). Before mounting the drive on the door shaft, the latter must be lubricated in the drive area.

## Emergency manual operation

Emergency manual operation is only intended for starting up the drive, maintenance work and emergency operation in order to open or close the door in the event of a short-term power failure. Emergency manual operation is only intended for short term manual operation.



### Attention

Before emergency manual operation is used, the door system must be disconnected from the power supply. Emergency manual operation is only allowed with the motor turned off, via hand crank, and can only be carried out by the service technician or instructed personnel.

Emergency manual operation is not intended for long-term use (e.g., from starting up the drive to continuous power supply).

Doors with counterweights must be set in such a way so that they are completely counterweighted in all positions. If the door is not balanced properly, the manual force required is increased and the service life of the emergency operation mechanism is reduced.



### Note (applies to A80 - A280)

The door must not be moved beyond the limit positions as otherwise a safety limit switch (S1F/S2F) is activated. Electrical operation of the door system is only then possible when the safety limit switch (S1F/S2F) is "released" via emergency manual operation.

4 different systems are available for emergency manual operation:

- Crank handle (HK)
- Light chain (LK)
- Disconnecting clutch (AK)



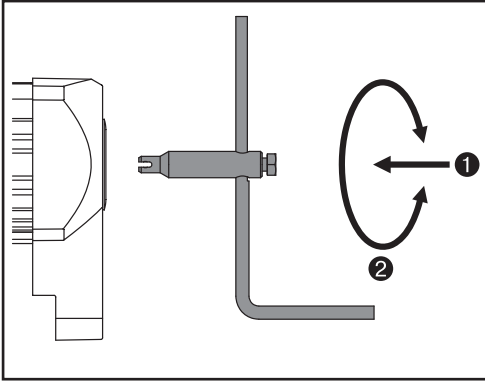
### Note

For each emergency manual operation, an appropriate sign (as per EN60335-2-103) must be permanently placed in the vicinity of the corresponding operating element describing how it is to be used.

Templates for this sign can be found in the Internet at [www.becker-antriebe.com](http://www.becker-antriebe.com).



# Assembly and Operating Instructions



## Crank handle (HK)

Firstly remove the cover. For emergency manual operation, the crank handle is inserted in the motor shaft.

The crank handle must firstly be snapped onto the motor shaft by applying slight pressure (1) and turning carefully (2) before the internal motor brake is released and proper emergency manual operation with the crank handle is possible.

The door can then be opened or closed with the crank handle by turning whilst applying slight pressure.

In order to prevent electrical operation of the door system during emergency manual operation, the safety switch S3F is opened upon insertion of the crank handle.



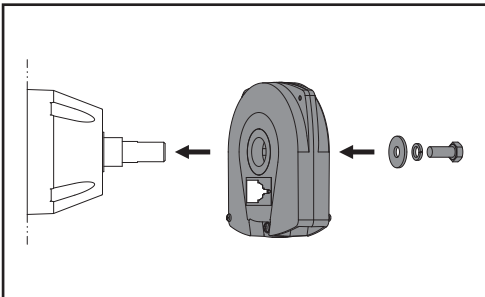
### Caution

Following operation, the crank handle must be removed as this may otherwise result in physical injuries and damage to property.



### Attention

Once the crank handle has been removed the cover must be refitted in order to maintain the drive's protection type.



## Light chain (LK)



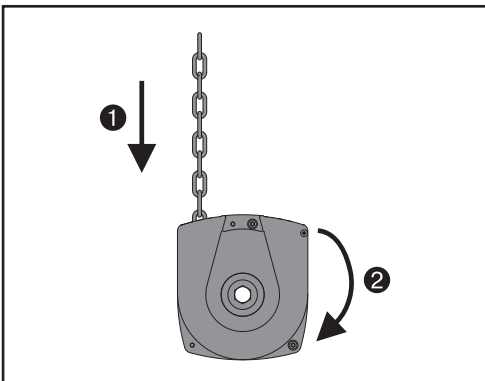
### Note

Drives with a light chain (LK) can be installed horizontally and, with an additional chain reverse unit, also vertically.

### Installation of the chain wheel with integrated chain guard

Attach the chain wheel with integrated chain guard so that the side with the sticker faces the drive.

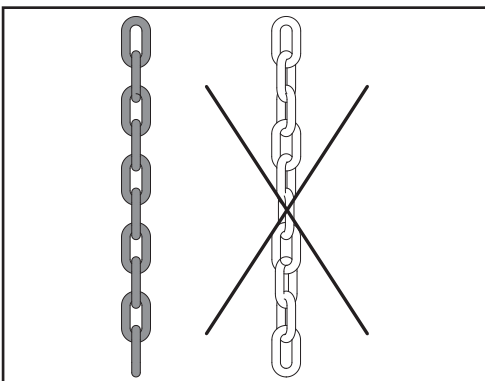
Fix the chain guard using a flat washer, spring washer and screw.



## Insertion of the chain

Turn the chain guard so the openings face upwards.

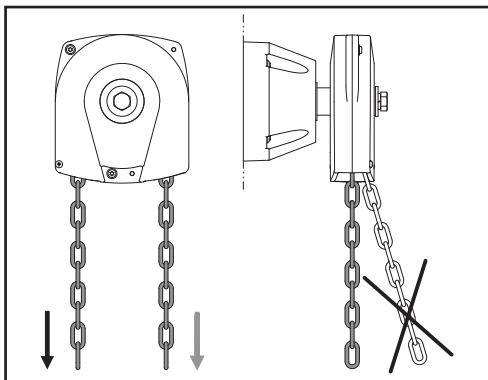
Take one end of the chain and insert this into the left opening of the chain guard (1). Ensure that the chain is correctly positioned in the guide. Then turn the chain casing (2) to the right until you are able to pull out the end of the chain in the other opening.



## Connection of the chain ends

Before connecting the ends of the chain using the chain lock it must be ensured that the chain is not twisted.

The chain lock must be fastened carefully.



## Operation



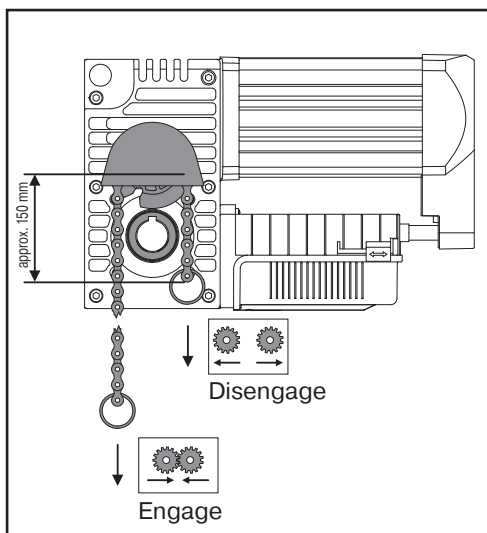
### Note

**In order to prevent repeated coupling and decoupling of the emergency manual operation mechanism, the chain is to be kept tense during operation.**

The door can be opened and closed manually by pulling the respective side of the chain vertically. In order to prevent electrical operation of the door system during emergency manual operation, the safety switch S3F is activated when the chain is pulled. Following operation it must be ensured that the chain hangs "freely" so that the safety switch SF3 is released and, thus, electrical operation is possible.



# Assembly and Operating Instructions



## Disconnecting clutch (AK)



### Attention

When using drives with a disconnecting clutch (AK) on sectional doors with spring compensation or a counterweight, it is imperative to install a spring fracture or anti-drop device to prevent the door from falling down.

A disconnecting clutch should only be used on sectional doors if the door system is fully counterweighted and the drive is not in operation.



### Note

Ensure that the chain wheel is turned as far to the left as possible.

## Installation of the chain and chain guard

- Mount the chain so that approx. 150 mm is suspended freely on the right-hand side.
- Push the chain guard onto the chain wheel hub until it audibly clicks into place.

## Operation

The drive is decoupled from the door shaft by pulling on the chain. The counterweighted sectional door can now only be opened and closed manually. Following operation, the drive must be coupled again by pulling the other end of the chain.



### Note

It must be ensured that the lower limit position of the door is set so that the cables for suspending the door remain taut, i.e., that the entire weight of the door hangs on the cables.

This guarantees the smooth running of the disconnecting clutch. Incorrect settings (slack cable) in the lower limit position prevent smooth running of the disconnecting clutch.

## Voltage switching



### Caution

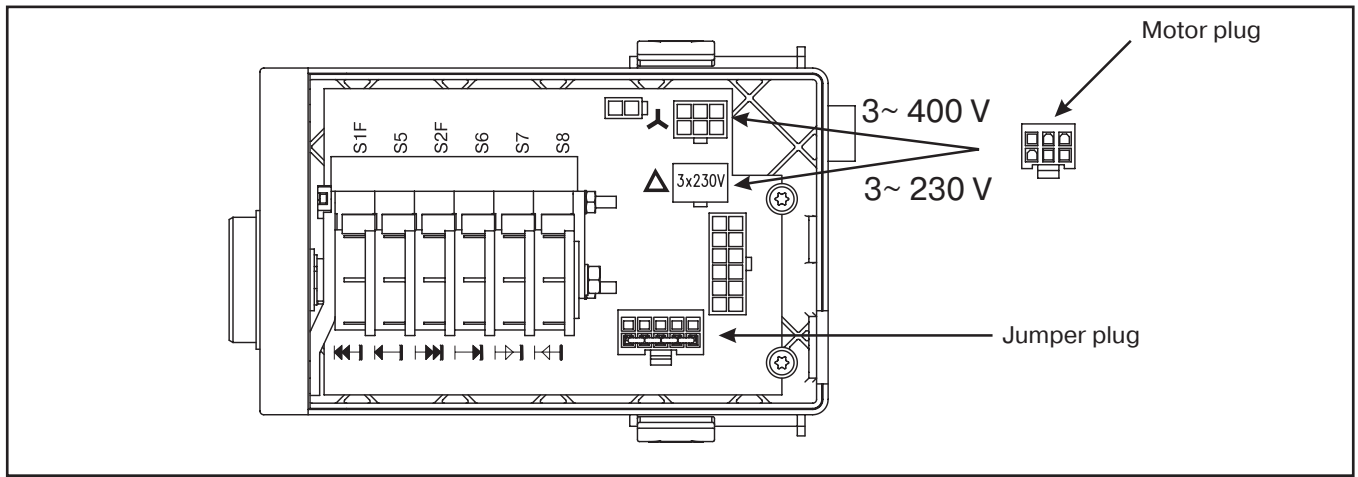
Before voltage switching, the drive must be safely disconnected from the mains.

The drives can be operated on a 3~ 400 V (Y star connection) or 3~ 230 V ( $\Delta$  delta connection) network. The drives are designed for operation on a 3~ 400 V network.

### Voltage switching for A80 - A280

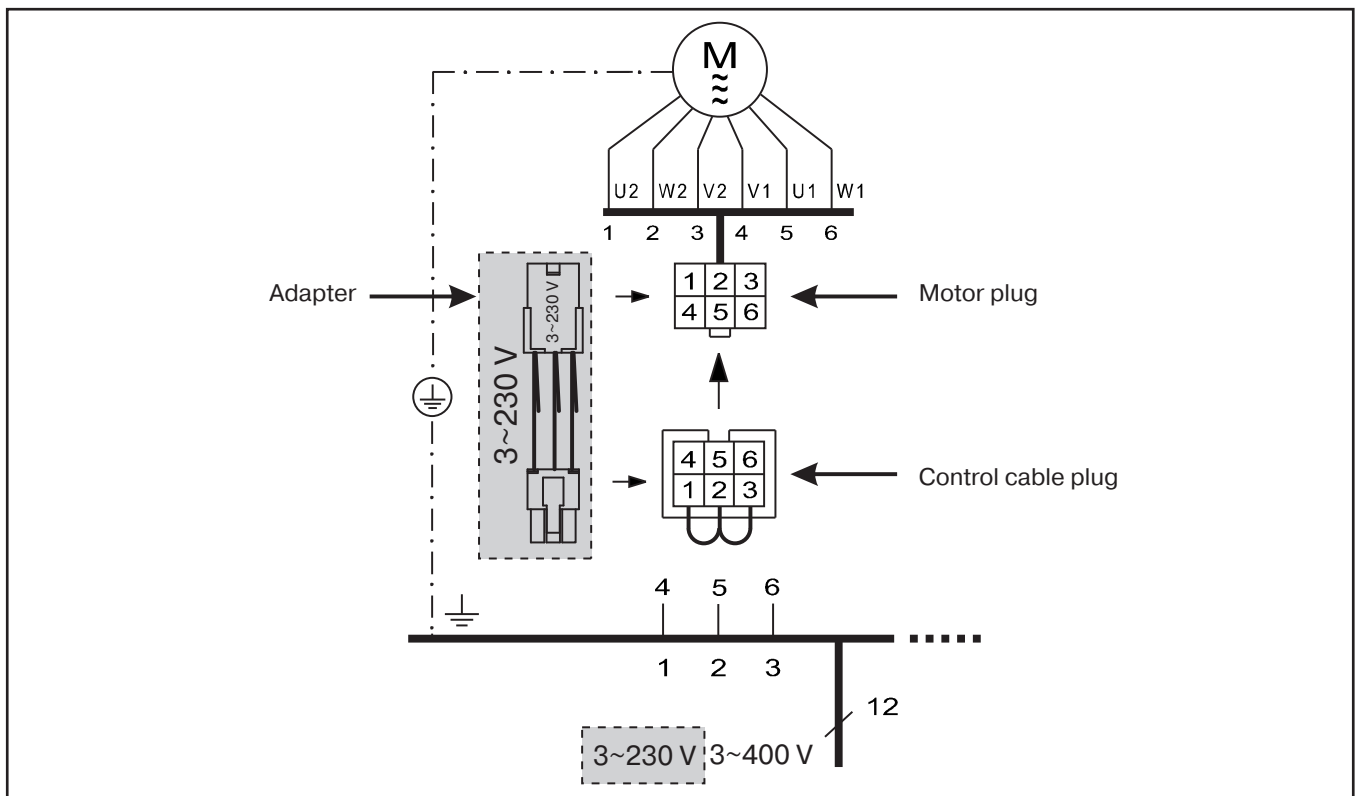
For operation on a 3~ 230 V network the drive must be switched from Y star connection to  $\Delta$  delta connection.

1. Remove the "3 x 230 V" sticker
2. Switch the 6-phase plug from Y to  $\Delta$ .



### Voltage switching for A80AE - A280AE

For operation on a 3~ 230 V network, the adapter with Art. No. 4822 200 203 0 must be used. This is connected between the motor plug with the coloured wires and the plug with wires 1, 2 and 3 of the control cable.



# Assembly and Operating Instructions

## Electric connection to the control unit and connection diagram



### Caution

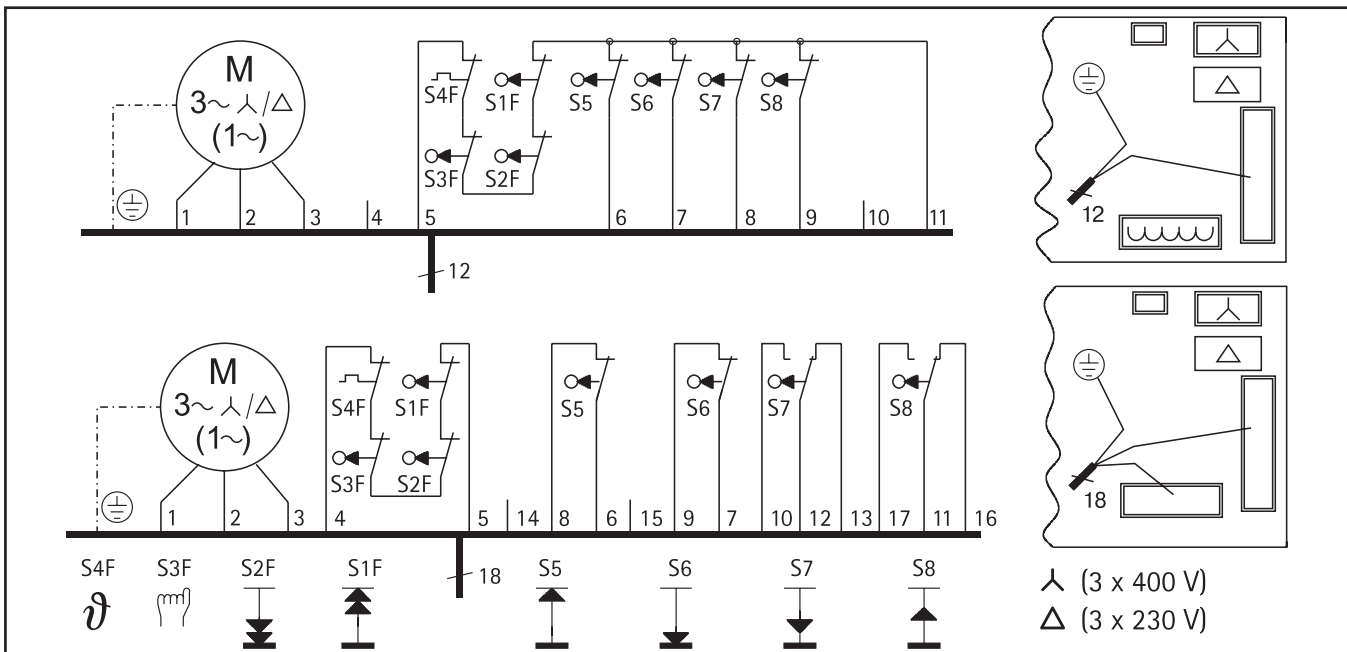
The electric connection may only be carried out by a qualified electrician! Please observe the information on the control unit to be used and the applicable EN standards! When all connection work is being carried out, the door system must be safely disconnected from the mains by removing the plug/switching off the main switch. Observe the drive's technical data. The limits given in the technical data must not be exceeded. In particular, protection of the door system which is to be performed by the customer must be carried out in accordance with the technical data!

When laying the protective conductor, it must be ensured that the protective conductor connection is disconnected last if the cable is pulled out unintentionally, e.g., by bundling the individual black wires of the connecting cable together to form a loop and fixing this with a cable tie.

Then lay the connecting cable in such a way that it is not in contact with the drive.

### Electric connection to the control unit and connection diagram for A80 - A280

To connect the drive to the control unit, only use original 12-core or 18-core control cables which have been approved by the manufacturer. The control cable can be plugged in. In order to guarantee strain relief and the protection type, the screw connection must not be undone. To plug in the 18-core control cable the 10 pole jumper plug in the drive must be removed. The plugs feature reverse polarity protection and click audibly into place. The yellow/green protective conductor wire must be connected to the designated push-on connector . Make sure that it engages firmly.



- S1F** -Safety limit switch **OPEN** - yellow
- S2F** -Safety limit switch **CLOSE** - yellow
- S3F** -Safety limit switch **HK/LK**
- S4F** -Thermoswitch

- S5** -Operational limit switch **OPEN** - grey
- S6** -Operational limit switch **CLOSE** - black
- S7** -Functional limit switch - orange
- S8** -Functional limit switch - green

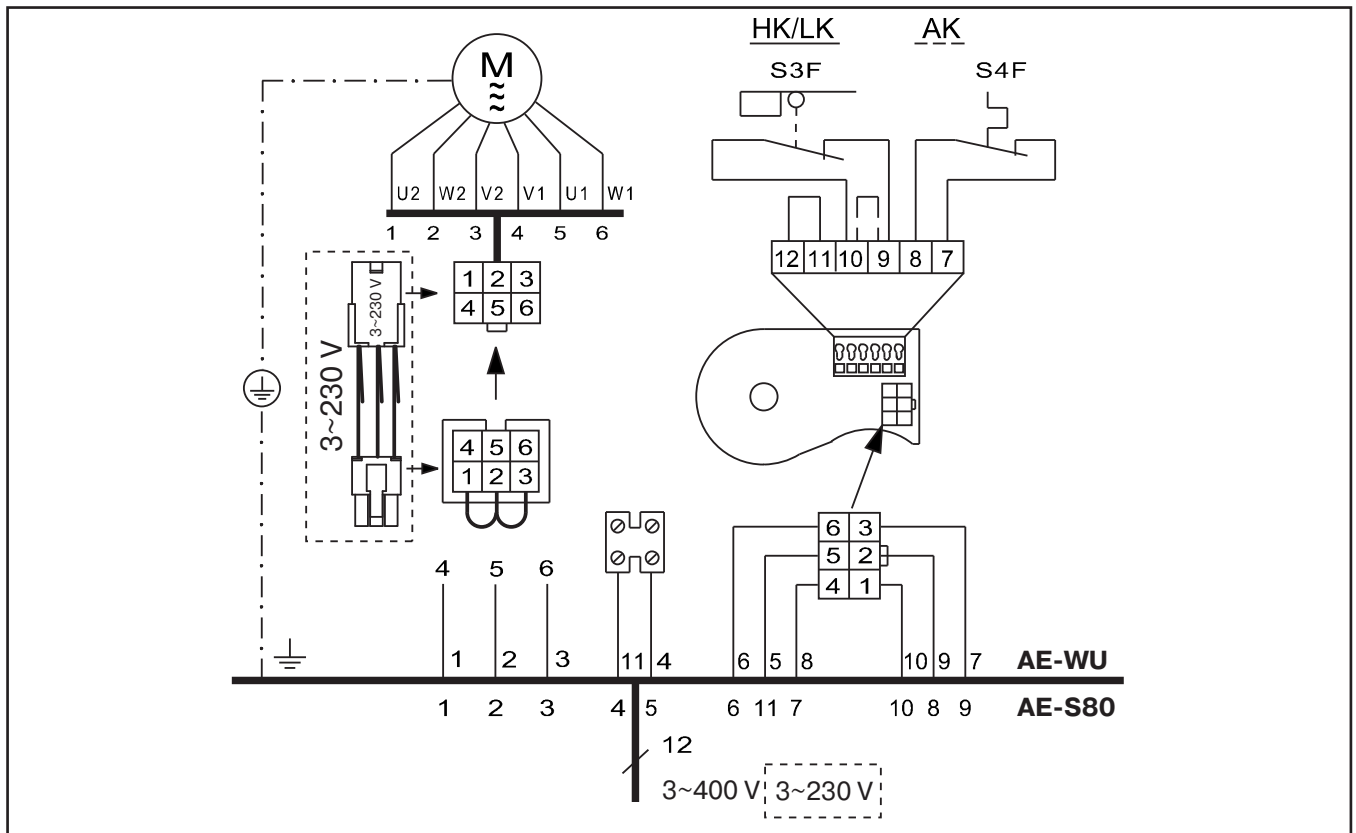


### Attention

The individual wires must not be in contact with the cams of the limit switch when the housing cover is closed.

## Electric connection to the control unit and connection diagram for A80AE - A280AE

To connect the drive to the control unit, only use original 12-core control cables which have been approved by the manufacturer. The control cable can be plugged in. In order to guarantee strain relief and the protection type, the screw connection must not be undone. The plugs feature reverse polarity protection and click audibly into place. The yellow/green protective conductor wire must be connected to the designated push-on connector ⚡. Make sure that it engages firmly.



### Absolute value encoder electrical interface:

#### Plugs (1-6)

- 1 - Safety chain input
- 2 - RS485 B
- 3 - GND
- 4 - RS485 A
- 5 - Safety chain output
- 6 - 7-18 V DC

#### Terminals (7-12 wired by manufacturer)

- 7/8 - S4F thermoswitch
- 9/10 - S3F Safety limit switch HK/LK (Jumper for AK)
- 11/12 - Jumper (possible connection point for external safety elements)

## Checking the running direction

The direction of drive rotation depends on how the three mains phases are connected to the control unit and has to be checked first. Proceed as follows:

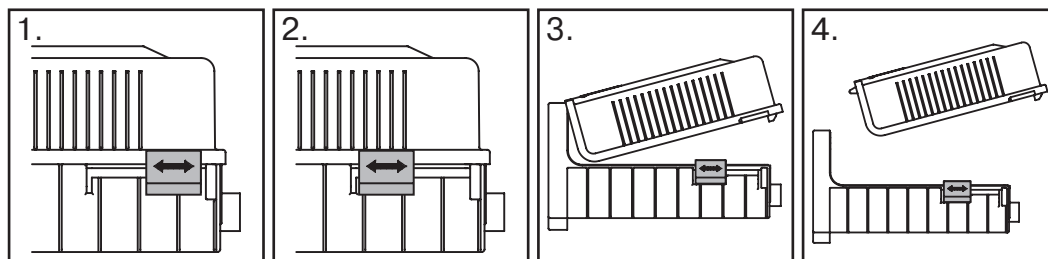
- Move the door into the semi-opened position using the emergency manual operation function.
  - Insert the mains plug of the control unit into the socket or switch the main switch of the control unit on.
  - Check that the control is in dead-man mode.
  - Use the OPEN and CLOSE buttons to verify whether the running direction of the door corresponds to the buttons pressed.
- If the running direction of the door does not correspond with the button commands, change the direction of rotation as described in the Assembly and Operating Instructions for the control unit. Then check the running direction again.

# Assembly and Operating Instructions

## Setting the door limit positions

### Opening the limit switch

If necessary remove the screws on the yellow bolts and carry out steps 1 - 4 shown below.



### Setting the limit switch for A80 - A280

The door drive comes with 6 cam end switches as standard. All cams have 12 lock-in positions for quick adjustment. Check that the control unit is in dead-man mode.

Proceed as follows to set the limit switch:

1. Turn all 6 cams out of the movement range of the door.
2. Use the "DOWN" button of the control unit to move the door to just before the lower limit position.
3. Turn the black cam S6 "CLOSE" until the precision set screw is within easy reach. Now use the fine precision set screw (flathead) to manually set the cam so that it switches. Move the door slightly up and down again until the end switch stops the door. If necessary correct the setting.
4. Now move the door to just before the upper limit position.
5. Now set the grey cam S5 "OPEN" as for point 3.
6. Now set the yellow safety cams S1F "UP" and S2F "DOWN" to lag both operational limit switches S5 "OPEN" and S6 "CLOSE".
7. The two functional cams S7 (orange) and S8 (green) can be set accordingly if required.
8. The limit switches are now set. Carry out a test run to check the set limit positions.



#### Note

If the orange functional cam S7 is used as a pre-limit switch for functional switch-off of the safety edge of the door, then it must switch a maximum of 5 cm above the floor; EN12453 and EN12445.

### Setting the limit switches for A80AE - A280AE

The drives are equipped with an absolute value encoder with which the control unit recognises the door's limit positions.



#### Attention

The absolute value encoder cannot be set in the drive.

The door limit positions are set directly in the control unit. Follow the Assembly and Operating Instructions for the control unit.

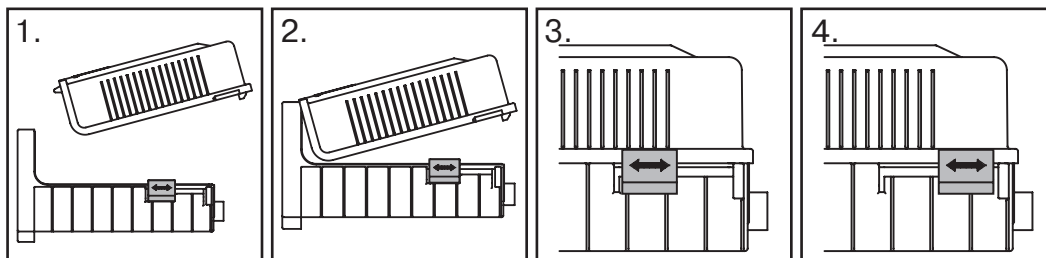
## Closing the limit switch

Take the screws which were previously removed or the screws in the housing cover and carry out steps 1 - 6 shown below.



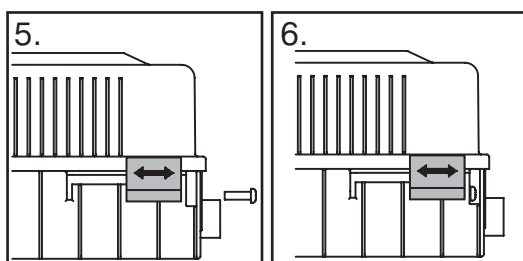
### Note

Make sure that the seal and the lining groove are clean and that the cover is properly positioned.



### Caution

When assembling the drive at a height of less than 2.50 m, the yellow bolts must be secured with the enclosed screws.



Tighten the screws carefully.



# Assembly and Operating Instructions

## Maintenance



### Attention

**The door system must be regularly checked by an expert to ensure that it is in safe working order. The door manufacturer stipulates the frequency of maintenance and checks according to national regulations and the frequency of use.**

### Counterweight (only applies to sectional doors with spring compensation or a counterweight):

The counterweight/spring tension must be checked. The sectional door should be counterweighted in every position. Note the door's operating instructions.

### The following checks must be performed on the drive:

#### 1. Fastenings:

All fastening screws, including the screws to secure the torque bracket, must be checked to ensure they are in good condition and fastened securely.

#### 2. Safety limit switches:

The functionality and switch-off point of the safety limit switches S1F, S2F and S3F must be checked. Follow the relevant assembly and operating instructions for the door control unit. The safety limit switches must be checked as per the connecting diagram for continuity.

Re S1F / OPEN (applies to A80 - A280)

Open to the upper limit position. Using the emergency manual operation function, keep opening up to the point where no damage occurs. The safety switch S1F must be checked as per the connecting diagram. There must be no continuity.

Re S2F / CLOSE (applies to A80 - A280)

Close to the lower limit position. Using the emergency manual operation function, keep closing until, in the case of sectional doors and vertical lift gates, the load-bearing medium (e.g., cables and chains) for suspending takes the complete weight of the door sections or, in the case of roller doors, the door slats are completely closed. It must be ensured that the cables do not fall from the cable drum. The safety switch S2F must be checked as per the connecting diagram. There must be no continuity.

Re S3F (applies to all HK and LK drives)

Before inspecting the safety switch S3F, the door system must be disconnected from the mains.



Insert the crank handle HK in the motor shaft or pull the light chain LK and keep it taut.



The safety switch S3F must be checked as per the connecting diagram. There must be no continuity.

#### 3. Gears:

The gears are lubricated for life and maintenance-free.

## Technical data

Type		Unit	A80/29 A80AE/29	A100/22 A100AE/22	A130/29 A130AE/29	A140/20 A140AE/20
Drive torque	T	Nm	80	100	130	140
Drive speed	n	rpm	29	22	29	20
Diameter of hollow shaft		mm	25.4	25.4	25.4	25.4 <sup>*3)</sup>
Operating voltage	U	V	3~230 / 400	3~230 / 400	3~230 / 400	3~230 / 400
Frequency	f	Hz	50	50	50	50
Nominal current	I	A	2.9 / 1.7	3.3 / 1.9	4.2 / 2.4	3.8 / 2.2
Performance factor	cos φ		0.76	0.76	0.78	0.78
Insulation material class			H	H	H	H
Thermoswitch		°C	170	170	170	170
Mode	S3	%	40	40	40	40
Protection type <sup>*1)</sup>	IP		54	54	54	54
Limit switch range		Revolutions	24	24	24	24
Static holding torque		Nm	400	400	400	400
On-site fuse protection			3x10 AT	3x10 AT	3x10 AT	3x10 AT
Permissible ambient operating temperature		°C	-10 to +35	-10 to +35	-10 to +35	-10 to +35
Weight <sup>*2)</sup> (approx.)		kg	10	10	11	11

Type		Unit	A150/13 A150AE/13	A220/13 A220AE/13	A280/12 <sup>*4)</sup> A280AE/12 <sup>*4)</sup>
Drive torque	T	Nm	150	220	280
Drive speed	n	rpm	13	13	12
Diameter of hollow shaft		mm	30	30	30
Operating voltage	U	V	3~230 / 400	3~230 / 400	3~230 / 400
Frequency	f	Hz	50	50	50
Nominal current	I	A	3.3 / 1.9	4.2 / 2.4	5.0 / 2.9
Performance factor cos φ	cos φ		0.76	0.78	0.78
Insulation material class			H	H	H
Thermoswitch		°C	170	170	170
Mode	S3	%	25	25	25
Protection type <sup>*1)</sup>	IP		54	54	54
Limit switch range		Revolutions	24	24	24
Static holding torque		Nm	400	400	400
On-site fuse protection			3x10 AT	3x10 AT	3x10 AT
Permissible ambient operating temperature		°C	-10 to +35	-10 to +35	-10 to +35
Weight <sup>*2)</sup> (approx.)		kg	10	11	11

<sup>\*1)</sup> Optional IP65

<sup>\*2)</sup> with the LK version, the weight is increased by approx. 0.5 kg.

<sup>\*3)</sup> Optional 31,75 mm

<sup>\*4)</sup> without prototype technical-release procedure

Deviations are possible in structually identical drives or special drives.

**The information on the type plate always applies.**

Subject to technical changes without notice



**BECKER**



**BECKER**

## **Declaration of incorporation of partly completed machinery within the meaning of Directive 2006/42/EC, Annex II Part 1B**

Manufacturer: **Becker-Antriebe GmbH  
Friedrich-Ebert-Str. 2-4  
35764 Sinn, Germany**

We hereby declare that the partly completed machinery

**Product designation:**        **Plug-in drive for roller doors and sectional doors**

**Type designations:**        **A80/29..., A80AE/29..., A100/22..., A100AE/22..., A130/29...,  
A130AE/29..., A140/20..., A140AE/20..., A150/13..., A150AE/13...,  
A220/13..., A220AE/13..., A280/12..., A280AE/12..  
with manual operation AK, HK, LK, LHK**

Serial number:                1024A0001 upwards

are intended for incorporation in a door system. This complies with the fundamental requirements of the following directives from the European Parliament and Council:

Directive 2006/42/EC	Directive on Machinery
Directive 2004/108/EC	Directive on Electromagnetic Compatibility

Applicable standards and technical specifications:

DIN EN 12453	Safety in use of power operated doors – requirements
DIN EN 60335-1	Safety of electrical appliances for household and similar purposes
DIN EN 61000-6-2	Generic standard – Immunity for industrial environments
DIN EN 61000-6-3	Generic standard – Emission standard for residential, commercial and light-industrial environments.

We furthermore declare that the special technical documentation for this partly completed machinery has been drawn up as per Annex VII Part B.

The commissioning of the partly completed machinery is not permitted until the partly completed machinery is incorporated into an item of machinery which complies with the regulations of the EC Directive on machinery and for which an EC conformity declaration as per Annex II Part A exists.

Authorised party for the compilation of the relevant technical documentation:

**Becker-Antriebe GmbH, Friedrich-Ebert-Str. 2-4, 35764 Sinn, Germany**

This declaration of incorporation was issued:

Sinn,

*16.6.2010*

Date

*[Signature]*  
Dipl.-Ing. Dieter Fuchs / Managing Director

Document No. TA 3 /10en









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